

## CENTRIFUGAL COMPRESSOR SURGE DETECTION USING A BI-DIRECTIONAL MFM IN A FUEL CELL SYSTEM

### ABSTRACT OF THE DISCLOSURE

A fuel cell system including a turbomachine compressor that delivers charge air to the cathode side of a fuel cell module. A bi-directional mass flow meter measures the airflow through the compressor, and provides an indication of a reverse airflow through the compressor for surge protection. A controller receives a signal from the mass flow meter indicative of the reverse flow. The controller controls a motor driving the compressor and a back pressure valve at the cathode exhaust of the fuel cell module to control the pressure in the fuel cell module to remove the surge condition.